

WHAT IS CLAIMED IS:

- [c01]**            1.        A power system comprising:

a fuel cell module adapted to receive a first fuel; and

a pulse detonation combustor adapted to receive and detonate a second fuel and exhaust a plurality of detonation products.
- [c02]**            2.        The power system of Claim 1, wherein said fuel cell module is further adapted to receive a first oxidizer, and wherein said pulse detonation combustor is further adapted to receive a second oxidizer.
- [c03]**            3.        The power system of Claim 2, wherein the first and second fuels are different fuels.
- [c04]**            4.        The power system of Claim 2, wherein the first and second fuels are the same fuel.
- [c05]**            5.        The power system of Claim 2, wherein the second fuel comprises the first fuel plus a tail gas from said fuel cell module.
- [c06]**            6.        The power system of Claim 2, further comprising a compressor configured to supply compressed air to at least one of said fuel cell module and said pulse detonation combustor.
- [c07]**            7.        The power system of Claim 6, wherein said pulse detonation combustor comprises a plurality of detonation chambers.
- [c08]**            8.        The power system of Claim 6, wherein both the first and the second oxidizers comprise compressed air.
- [c09]**            9.        The power system of Claim 8, wherein said pulse detonation combustor is further adapted to receive a supplemental oxidizer.

[c10] 10. The power system of Claim 9, wherein the supplemental oxidizer comprises oxygen ( $O_2$ ).

[c11] 11. The power system of Claim 8, wherein said fuel cell module comprises at least one fuel cell stack comprising at least one fuel cell unit.

[c12] 12. The power system of Claim 2, further comprising a turbine positioned downstream from said pulse detonation combustor, said turbine being in flow communication with said pulse detonation combustor.

[c13] 13. The power system of Claim 12, further comprising a generator connected to said turbine, said generator being adapted to generate electricity.

[c14] 14. The power system of Claim 13, further comprising a steam turbine assembly adapted to receive an exhaust stream from said turbine, to generate steam using the exhaust stream, and to generate power using the steam.

[c15] 15. The power system of Claim 14, wherein said steam turbine assembly comprises:

a steam turbine adapted to generate power using the steam;

a condensor adapted to receive and condense an exhaust steam from said steam turbine to supply a fluid stream; and

a pump adapted to receive and pump the fluid stream.

[c16] 16. The power system of Claim 15, wherein said steam turbine assembly further comprises a heat recovery steam generator adapted to receive the exhaust stream from said turbine, to receive the fluid flow from said pump, and to generate steam from the fluid flow using the exhaust stream.

[c17] 17. The power system of Claim 2, further comprising a reformer adapted to receive and reform a fuel and to generate a reformat, wherein the first fuel comprises the reformat.

[c18] 18. The power system of Claim 17, wherein the second fuel also comprises the reformat.

[c19] 19. The power system of Claim 18, wherein the second fuel further comprises a tail gas from said fuel cell module.

[c20] 20. The power system of Claim 17, wherein said pulse detonation combustor is adapted to operate in a stand-alone mode, and wherein said reformer is adapted to supply the reformat to said pulse detonation combustor for operation in the stand-alone mode.

[c21] 21. The power system of Claim 20, wherein said pulse detonation combustor is adapted to operate in a stand-alone mode while said fuel cell module is in a warm-up mode.

[c22] 22. The power system of Claim 1, wherein said pulse detonation combustor is adapted to operate in a stand-alone mode.

[c23] 23. The power system of Claim 22, wherein said fuel cell module is adapted to operate in a stand-alone mode.

[c24] 24. The power system of Claim 22, wherein said pulse detonation combustor is adapted to operate in a stand-alone mode while said fuel cell module is in a warm-up mode.

[c25] 25. A power system comprising:

a fuel cell module adapted to receive a first fuel;

a pulse detonation combustor adapted to receive and detonate a second fuel and exhaust a plurality of detonation products;

a turbine positioned downstream from said pulse detonation combustor, said turbine being in flow communication with said pulse detonation combustor; and

a compressor configured to supply compressed air to at least one of said fuel cell module and said pulse detonation combustor.

[c26]            26.     The power system of Claim 25, further comprising a generator connected to said turbine and adapted to generate electricity.

[c27]            27.     The power system of Claim 25, wherein said pulse detonation combustor comprises a plurality of pulse detonation chambers.

[c28]            28.     The power system of Claim 25, wherein the first and second fuels are different fuels.

[c29]            29.     The power system of Claim 25, wherein the first and second fuels are the same fuel.

[c30]            30.     The power system of Claim 25, wherein said fuel cell module comprises at least one fuel cell stack comprising a plurality of fuel cell units.

[c31]            31.     The power system of Claim 25, wherein said pulse detonation combustor is adapted to operate in a stand-alone mode.

[c32]            32.     The power system of Claim 25, further comprising a reformer adapted to receive and reform a fuel and to generate a reformat, wherein the first fuel comprises the reformat.

[c33]            33.     The power system of Claim 32, wherein the second fuel comprises the reformat.

[c34] 34. The power system of Claim 33, wherein the second fuel further comprises a tail gas from said fuel cell module.

[c35] 35. The power system of Claim 32, wherein said pulse detonation combustor is adapted to operate in a stand-alone mode, and wherein said reformer is adapted to supply the reformat to said pulse detonation combustor for operation in the stand-alone mode.

[c36] 36. The power system of Claim 32, further comprising a steam turbine assembly adapted to receive an exhaust stream from said turbine, to generate steam using the exhaust stream, and to generate power using the steam.

[c37] 37. The power system of Claim 36, wherein said steam turbine assembly comprises:

a steam turbine adapted to generate power using the steam;

a condensor adapted to receive and condense an exhaust steam from said steam turbine to supply a fluid stream;

a pump adapted to receive and pump the fluid stream; and

a heat recovery steam generator adapted to receive the exhaust stream from said turbine, to receive the fluid flow from said pump, and to generate steam from the fluid flow using the exhaust stream.

[c38] 38. The power system of Claim 25, wherein said pulse detonation combustor is adapted to operate in a stand-alone mode while said fuel cell module is in a warm-up mode.

[c39] 39. The power system of Claim 25, wherein said pulse detonation combustor and said turbine are sized larger than is required for a nominal, steady operation of said power system.